



OIL

**OFFSPRING
INTERNATIONAL
LIMITED**


M A R I N E
D I V I S I O N

VALVES & ACTUATORS

Offspring International specialises in equipment for mooring, offloading, telemetry and control systems to optimise terminal operations both offshore and quayside.

Offspring (OIL) offers a fully integrated supply of equipment for single point mooring (SPM) and conventional buoy mooring (CBM), hoses, breakaway couplings, valves and actuators, together with a comprehensive Offshore Ops terminal monitoring and management system. Using experience and expertise gained over 30 years, Offspring International is also able to support other mooring applications including renewables, navigational moorings, chain ferries, port operations, aquaculture etc.

Based in Dudley near Birmingham, UK, with a subsidiary office in Laguna Niguel, California, Offspring International supplies a range of SPM and tandem offtake mooring systems following the OCIMF 2018 'Recommendations for Equipment Employed in the Bow Mooring of Conventional Tankers at Single Point Moorings', including single or dual hawser configuration, single leg-type mooring hawser and grommet-type mooring hawser manufactured and supplied in strict accordance with the OCIMF 2000 Guidelines for the Purchasing and Testing of SPM Hawser.

Integrated Mooring System Supply

Offspring International offers a complete service for Single Point and Conventional Buoy Mooring systems, from design and supply of the entire offtake system, to replacement of mooring hawsers, hoses and associated hardware. Our approach is based on experience of providing mooring systems across the globe; we take a systematic approach to assessing the offshore environment, hawser and hose design, testing, and installation conditions.

All Offspring mooring systems and products offer outstanding operational performance, reliability and safety, and include chafe chains, mooring hawsers, pick-up and messenger ropes, support buoys, shackles, associated fittings and load monitoring equipment. In addition, Offspring is able to supply floating, submarine and catenary hoses in accordance with GMPHOM 2009.

Industry Partners

Offspring International is the exclusive worldwide agent for Lankhorst Offshore for SPM systems and Paladon Systems' Pipeline End Manifold control systems, as well as international agent for MAN Oil & Marine floating marine and submarine offloading hoses and for Marine Division valves and actuators. In addition, Offspring has a strong partnership with fluid transfer systems specialist Techflow Marine, offering the Quay Reel® flexible loading and unloading system.

Enhanced Terminal Monitoring

Offshore Ops, working in partnership with Offspring International, offers industry leading software and technologies for mooring and offloading operations. Offshore Ops' fully OCIMF SMOG 2015 compliant Integrated Terminal Management System has been systematically developed over 12 years to provide 'live' data on a wide range of operational and environmental factors, as well as effective operations management, significantly reducing risk and operating costs and enhancing mooring and offloading safety, availability, efficiency and performance.

Offshore Ops' system allows terminals to maximise increase safety, reduce operating costs and reduce environmental incidents.

Strength and Depth

Offspring has a worldwide customer base together with a comprehensive international network of agents.

Offspring International values long-term, customer relationships and so a commitment to excellence in customer service is one of our key strengths.

We go beyond the normal pre-sales technical advice and project management expected when delivering mooring and offloading systems on-time and within budget.

Our service also includes post-installation reviews and through-life support.



Marine Division



Marine Division is an independent contractor specialising in the supply of manual and actuated valves to the Power, Oil & Gas, and Infrastructure industries.

Marine Division has been developed based on experience and knowledge gained from over 20 years in the supply of valves, actuators and associated equipment for onshore and offshore projects worldwide, either topside or subsea.

As an independent company specialising in the supply of equipment for pipelines, Marine Division has created global partnerships with a wide range of leading manufacturers. This unique position enables Marine Division to select valves being, linear or quarter-turn, commodity or bespoke items, manual or automated from a host of world class manufacturing facilities to suit the needs of customer specifications.

Working in partnership, Marine Division uses its expertise to determine the needs of each operator and system, selecting the correct products to best fit the requirements taking into consideration the external influences that drive the commercial & technical aspects. By creating tailor-made packages around each customer's specification, Marine Division has the understanding and experience to provide customers with a quality and cost-effective solution from a single source.

Marine Division creates value for its customers throughout the lifecycle of a contract. Utilising years of experience and expertise, Marine Division's core competencies benefit customers across a wide range of areas including engineering, project management of equipment, procurement, supply, and equipment. Whilst also ensuring all technical and deliverable requirements are met, with customer specifications central to the package Marine Division delivers.

Including Marine Division in a project creates value added from inception to completion by integrating Marine's knowledge, experience and support with other project stakeholders.

Sectors

Marine Division supply to a range of industries including Oil & Gas, Energy, Mining, Marine and Rail.

Commitment to Quality

Today companies are subject to a higher level of scrutiny from all stakeholders than ever before. Marine Division is accredited to ISO 9001, widely seen as the most credible, robust and effective assessment of a business's operational standards.



Valve Range & Selection

Working with Marine Division, Offspring International offers a range of high quality offshore valves ensuring safe and efficient fluid transfer operations between pipeline, buoy and tanker.

Valves are essential to the function of loading and offloading systems. By partnering with Marine Division, Offspring offers its customers access to the valve ranges of the world's leading manufacturers to suit the requirements of a variety of offloading systems including SPM, CBM, PLET and PLEM.

Offspring International is able to supply all valves from ball, butterfly, gate (including through conduit), globe, check and plug valves either manual or actuated. All valves supplied by Offspring are designed and manufactured under quality systems in accordance with ISO 9001 and to the applicable standards including those set out by the American Petroleum Institute (API), American National Standards Institute (ANSI) and American Society of Mechanical Engineers (ASME).

Please find below typical maximum operating pressure per class at ambient temperatures.

Standard Pressure Class of Valve		150#	300#	600#	900#	1500#	2500#
Maximum Operating Pressure	Bar	19	49.6	99.3	149	248	414
	PSI	275	720	1440	2160	3600	6000

Operating Temperatures may affect body and seal material selection
For Pressure / Temperature of all material groups please refer to ASME/ANSI B16.34

In addition, Offspring is able to supply a variety of Pipeline End Manifold (PLEM) control options with partner Paladon Systems.



Valve Selection

In order to select the appropriate valve and provide reliable transfer operations, Offspring works with the customer to determine as minimum the following details:

- Purpose (On / Off / Control)
- Type
- Pipeline size
- Pressure rating
- End connection
- Process data:
 - Design pressure
 - Design temperature
 - Operating pressure
 - Operating temperature
 - Body and trim material (if known)
 - Process media
- Functionality of the valve (On / Off / Control)
- Special requirements
- Operation (Manual / Actuated).

By determining these vital parameters, Offspring can supply valves which contribute to a cost-effective system that meets or exceeds the operational performance and required service life.

Valve Connections

Valves can be purchased with a number of end connections; choice of flange connection is dependent upon size, class rating and customer maintenance philosophy. Valves can either be permanently affixed to pipeline via welding or bolted so that the valve may be removed.

Five main connections are available:

Flanged - Raised face, ring type joint, flat faced or tongue and groove, and normally designed to ANSI B16.5 or MSS SP44 for larger bore items.

Butt Weld - Butt weld ends can be incorporated for all sizes and pressure ratings and generally in accordance with ANSI B16-25.

Socket Weld - Socket weld ends are supplied in accordance with ANSI B16-11.

Threaded - Threaded ends are supplied in accordance with ANSI B16-11.

Hubbed - Designed to vendor specific drawings to match mating flanges. Offspring works closely with all Hub manufactures to support GA drawing supply and ensure incorporated into the manufacturing program of the valve and flanges.

Hose End Valves

Valves for regulating fluid transfer between the hose string and tanker.

Usually found on a floating hose, hose end valves are used for the On / Off operation of transference of fluid from the hose to the tanker, as well as, preventing water ingress whilst not in operation. Offspring offers lightweight valves to reduce the impact on the buoyancy of the floating offloading hoses, as well as robust construction to handle years of heavy lifts and service life mostly spent in water.

Examples of Offspring's range of hose end valves include:

Valves for Oil Products

API609 CAT A - Concentric Butterfly Valves

Key Features:

- Reinforced vulcanised seat for high line velocities
- Pinless stem design
- Anti-blowout stem
- Bearing suitable for submerged service
- Lever operated up to 20" - Reduced operating and zero leakage up to 6 Bar G
- Available in wafer (4 locating holes) or fully lugged
- Can be supplied with 300# flange connection (both Class 150#)
- Standard testing - API 598
- Pressure Equipment Directive.

Variations of materials available include:

- **Body** - Carbon Steel / Aluminium Bronze
- **Disc & Stem** - Stainless Steel / Aluminium Bronze / Monel
- **Seals** - FKM / NBR

Alternative designs of butterfly valves to suit the hose line are available on request.



Valves for LNG Transfer

API609 CAT B - Butterfly Valve

High performance butterfly valves providing a soft seated double eccentric or metal seated triple eccentric, options dependent upon service medium are available. These valves have the ability for On / Off operation and enable throttling of flow where necessary. Materials available for all types of applications.

Key Features:

- Pinless stem design
- Anti-blowout stem
- Bearing suitable for submerged service
- Gear operated - fully rated (submerged service or maranised gear box available)
- Available in wafer (4 locating holes), fully lugged or double flanged
- Available in all classes
- Standard testing - API 598
- Pressure Equipment Directive
- Firesafe certified
- Suitable for cryogenic service
- Cost effective solution to reduced bore items.



Buoy & Subsea Valves

Located within the CALM, on the buoy as well as subsea with the PLEM (Pipeline End Manifold) and PLET (Pipeline End Termination), valves are utilised as On & Off type, controlling the transfer of fluid.

For operation on the buoy and subsea, Offspring offers a range of ball or through conduit valves suitable for emergency shutdown, flowline, isolation, manifold, pig launching and receiving, PLEM, PLET and risers.

Examples of Offspring's range of buoy and subsea valves include:

API6D - Ball Valve

Key Features:

- -101 to 350 °C
- Soft or metal seated with hard facing on ball and seats
- Self-relieving (Standard)
- Double piston available upon request
- Combination of above-mentioned seats
- Double Block and Bleed Design (DBB)
- Secondary seals
- Anti-static
- Anti-blowout stem
- Sealant injection on both stem and seats available on request
- Low fugitive emission stem packing available
- O-ring, lip seals & graphite options available
- CRA Overlay - available (extent to be defined by project)
- Extended bonnet.

API6DSS - Subsea Side Entry Ball Valve

Subsea side entry ball valves maintain an average service life of 25 years offering reliability and safety under high pressure and harsh service conditions. Subsea side-entry ball valves are available in a wide range of materials and configurations to meet both customer's requirements and specific application needs. Features as per API6D along with the below.

Key Features:

- Temperature -101 to 220 °C
- Body sealing configuration for the protection of sea water ingress
- Hyperbaric testing available
- CAP Test on request.

API6A / API6D - Through Conduit Gate Valves

Suitable for pipelines including subsea and high pressure, through conduit gate valves utilise double-expanding, two segment gates. Each seat gate is machined with an angle designed to cause the expansion of the gate in both open and closed positions. The closed position provides a double barrier, and with the valve open is isolated from the cavity, whilst providing a full conduit.

Key Features:

- Corrosion resistant
- Fast closure
- Tight sealing
- Inherently fire safe
- Double Block and Bleed Design (DBB)
- Full or reduced bore
- Bi-directional
- Metal to metal seating
- On / Off
- Rising stem (OS&Y)
- Hard facing only
- Suitable for abrasive, high temperature and corrosive lines.



Operators

Operators are utilised for driving valves from open to closed and anywhere in between depending upon the application, control of process system, inaccessibility, emergency shutdown / fail safe, excessive torque and safety, these can either be Manual or Automated.

Working with the customer and Marine Division, Offspring ensures an operator appropriate to the requirements of the system. An operator must provide enough torque to move and re-seat the valve, as well as, maintaining its position with the minimum power supplied, be able to fully travel either rotary, i.e. 90°, 180° or linear and incorporate protective measures to prevent an oversupply of power.

Offspring offers a range of manual and automated operators to suit the operational needs of the system.

Manual Operators

Levers / Handwheels

Lever operators enable the movement of the valve and are associated with quarter-turn valves, the 90° turn will either open or close the disc, plug or ball valve. Whereas handwheels are associated with linear operated valves such as globe and gate.

Lever operators are usually utilised at lower torque, once the torque has increased to a point of oversizing it is recommended that gear operators are used. Gear operators are split into two types, bevel (Linear) and worm (90°); both provide a range advantages for manually operated higher torque and thrust items. Gear operators can also be easily integrated into an electric actuator package to reduce actuator sizing.

Bevel

Bevel gears are used to increase the thrust efficiency and are utilised for linear operated valves, for example, gate & globe valves.

Worm

Worm gears provide an effective solution for safe operation of high-pressure / high torque valves, gear units also carry a distinct advantage in subsea applications for speed in operation with the use of manual diver or ROV operations.

ROV

Both bevel and worm gears can be supplied with ROV Bucket / Operation and compensators for subsea applications. These normally are supplied with double barrier protection to prevent the ingress of water - IP rated.



Automated Operators

Valve automation provides terminals with a range of benefits including the ability to pre-set operating positions which can then be optimised with minimal involvement. Offspring offers operators for all type of valves including linear, quarter-turn and multi-turn, suited for onshore / offshore and subsea applications. Each valve can be powered from hydraulic, electric or pneumatic and a combination of sources unless stated otherwise.

Linear Actuators

Linear actuators operate in a reciprocating motion i.e. up and down, typically operating gate and globe valves.

Quarter-turn Actuators

Most part-turn valves, such as ball, butterfly and plug, have a travel of 90° offering an advantage over multi-turn due to the known distance of travel and relatively low power requirements.

Multi-turn Actuators

Powered from electrical sources, multi-turn actuators work with all type of valves. Subsea actuation utilising an electric multi-turn operator complete with gear box provides an alternative solution to powering the actuator, with lower costs than associated with traditional methods, along with reduced losses of pressure and leakages within the power units.

Ancillary Items

Offspring International offers a range of ancillary items enabling the safe transfer of fluids to and from the terminal.

Spool Pieces

Spool pieces are utilised with either an integrated spool piece and CAM lock or studded version requiring spool pieces to be manufactured. Spool pieces are manufactured from galvanised steel and suitable for Class 150 ANSI, Class 300 ANSI, and other flange types. Comprising two WNF Flanges, the spool pieces are supplied with or without lifting lugs. All welds are NDE tested with certification for lifting apparatus if included.

Camlock Couplings

Allowing for connection on and off flanges within less than 1 minute, the camlock coupling flanges are designed to enable automatic location of the hose flange within the camlocks. This enables hazard-free connection and disconnection of a hose string and a tanker manifold during standard operation, and blind flange after operation. Offspring's camlock coupling are suitable for Class 150 ANSI, Class 300 ANSI, DIN and other flange types.

Existing flange or pipe arrangements can be used with the camlock coupling. The camlock coupling is constructed from nickel-plated and painted carbon steel or stainless steel; other materials are available to special order. The flange's O-ring face seal provides a leak resistant connection and is available in a range of elastomeric rubber materials dependent on the product in transfer.

Locking, tightening and releasing the coupling is simplicity itself - a round steel bar, or optional locking wrench, is all that's needed. Once tightened with a wrench, each CAM activates a built-in ratchet lock, and, once removed, the pawl grips tightly against the ratchet teeth preventing anti-rotation. The camlock couplings include optional cam guards, lifting lugs and special paint finishes.

Blind Flanges

Offspring offers blind flanges in aluminium and galvanised steel to protect the hose when not in service. Available in Class 150 ANSI, Class 300 ANSI, DIN and many other flange types, the flanges prevent seawater entering the hose.

Bolting

Bolting provided can be tailored for each individual company, Teflon coated, materials can be supplied at standard lengths or to suit in all material grades - standard - BOLT ASTM A 193 GR B7 / NUTS ASTM A 194 GR 2H CARBON STEEL.

Gaskets

Offspring can provide all gaskets for both class 150# & 300# suitable for all mating surfaces to prevent leakage while under compression.

PLEM Control

SPM & CBM systems feature a Pipeline End Manifold containing single and multiple valves to control flow to and from the terminal. Smooth operation of the valves is critical to maximising tanker movements and trouble-free scheduling.

Offspring offers a range of PLEM control systems to help optimise terminal operations, from tried and tested designs to the latest innovations.

SPM PLEM Control

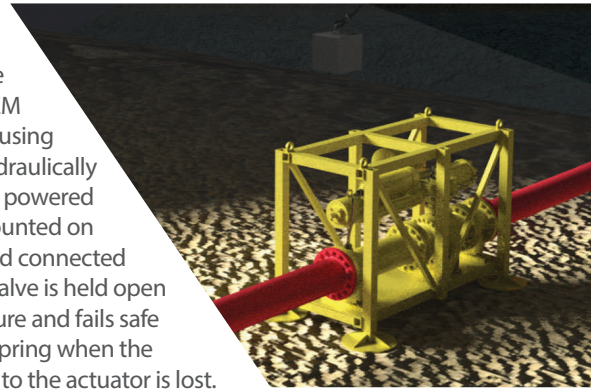
The PLEM is connected to the SPM CALM buoy via flexible submarine hose(s), typically in either a "Chinese lantern" or "Lazy S" configuration, enabling oil to be transferred to and from the tanker via a floating hose. Offspring International offers the following PLEM control options:

Manually controlled valve - operated by diver. Ideal for shallow water where calm Sea States are the norm. These valves are normally left permanently open and only closed for a hose change out or in the event of an emergency.

Remote double - acting valve operation from the SPM buoy. The PLEM valve is controlled using a double-acting hydraulically operated actuator, powered open and closed by Hydraulic Power Unit (HPU) mounted on the CALM buoy and connected by a control umbilical.

Remote single

- acting valve operation from the SPM buoy. The PLEM valve is controlled using a single-acting, hydraulically operated actuator, powered open by a HPU mounted on the CALM buoy and connected by umbilical. The valve is held open by hydraulic pressure and fails safe via the actuator's spring when the hydraulic pressure to the actuator is lost.



CBM PLEM Control

For CBM offloading operations, Offspring offers a diver operated valve PLEM control option, as well as the Autonomous Shutdown Valve and its associated benefits.

Autonomous Shutdown Valve



With increasing demands for more efficient tanker scheduling and greater loading / offloading availability, Offspring International offers Paladon Systems' patented Autonomous Shutdown Valve (ASV).

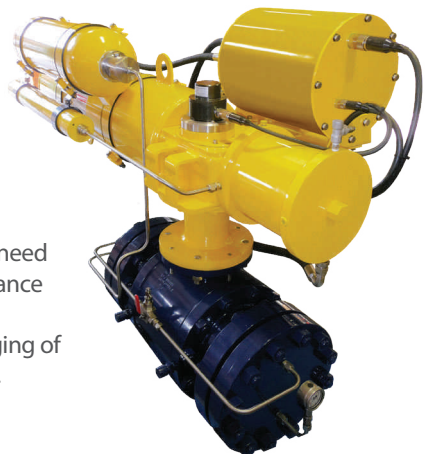
Fully autonomous and self-contained, the ASV offers terminal operators fail-safe offloading operations, greater system availability, and emergency shutdown capability.

Suitable for CALM buoy and CBM systems, the ASV removes the restrictions on offloading operations typically imposed by manual valve operation that can require expensive diver interventions and are only possible during fair weather.

The ASV also replaces the extended chain of components needed with a hydraulically operated valve actuator, powered

open by a CALM buoy mounted HPU; effectively removing reliance on a surface control umbilical.

It also eliminates the need for frequent maintenance visits to the buoy for checking and recharging of HPU system pressure.



Offshore Ops - Integrated Terminal Management



Offshore Ops' Terminal Management System allows oil terminals to maximise terminal availability and efficiency, increase safety, reduce operating costs and reduce environmental incidents through a range of industry leading software and technologies.

Offshore Ops' fully OCIMF SMOG 2015 compliant Integrated Terminal Management System has been systematically developed over 12 years to provide 'live' data on a wide range of operational and environmental factors, as well as effective operations management, significantly reducing risk and enhancing mooring and offloading safety and performance. The compact modular system offers a range of terminal management, environmental and equipment monitoring devices, seamlessly integrated into a single, secure software package.

In addition, the software enables greater efficiency in terminal management by allowing comprehensive monitoring and control over consignment scheduling, asset management and policy and procedural adherence.

Offshore Ops - Enhanced Terminal Monitoring

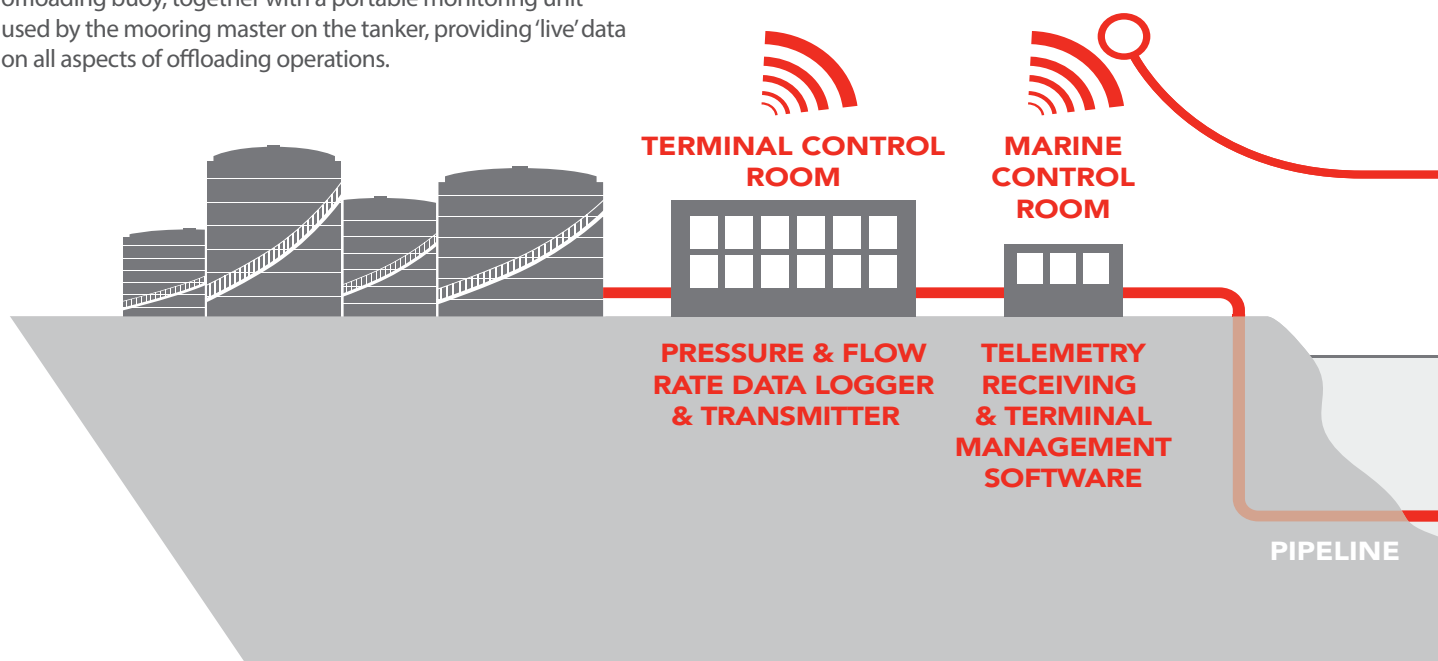
Offshore Ops' Integrated Terminal Management System has been developed based on the needs of single and multi-operator terminals. It comprises an array of sensors on the offloading buoy, together with a portable monitoring unit used by the mooring master on the tanker, providing 'live' data on all aspects of offloading operations.

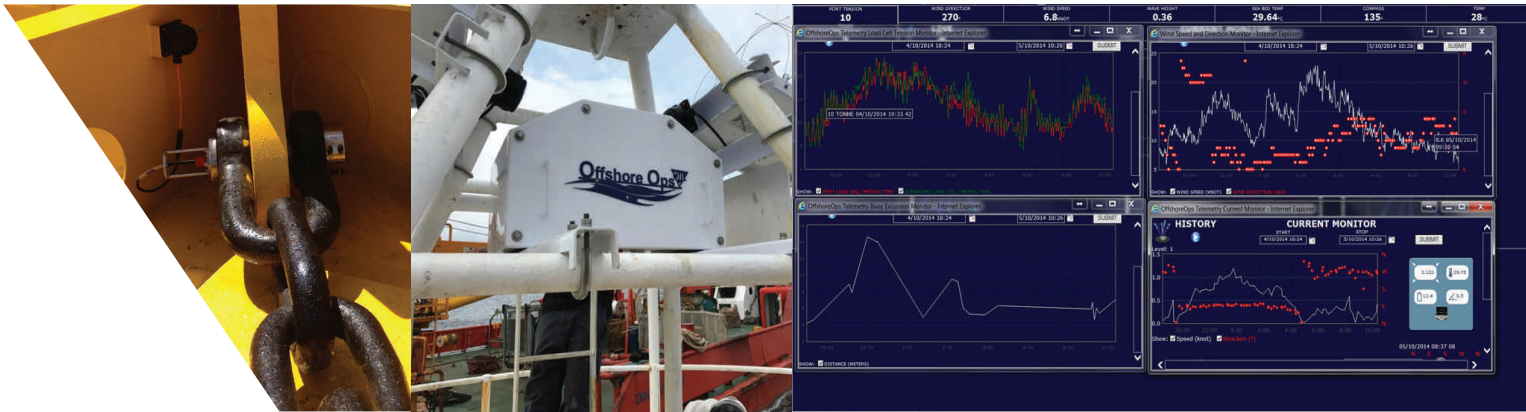
Benefits of the system include the ability to maximise Uptime and minimise Downtime, by monitoring various offloading and weather conditions to ensure it is safe to continue to operate.

Improved Mooring Operations

Combined GPS and compass heading monitoring of both the buoy turntable and tanker ensures trouble-free moorings. Tanker disorientation can be picked up early, allowing corrective action to be taken. In the event the buoy moves off-station, indicating a possible mooring chain failure, the integrated system will automatically issue an alert.

Offshore Ops' modular Integrated Terminal Management System enhances offloading operations by offering the ability to monitor operations from anywhere, including inspection and maintenance schedules to ensure equipment performance, and real-time data to the tanker, allowing safer mooring. All buoy and tanker data is encrypted during transmission.





System Benefits

In addition to the mooring and environmental advantages of using the Integrated Terminal Management System, the operational benefits include:

- Consignment scheduling
- Asset register
- Planned maintenance
- Policy and Procedural adherence.

Consignment Scheduling

Plan and schedule arrival of vessels and their cargoes and maintain a full history of every vessel's movements from arrival into Port, demurrage times, loading / discharge times, and volume of cargo.

Planned Maintenance

The predetermined inspection and equipment change-out regime embedded in the system ensures that all parts of the SPM are checked and verified as per industry best practice and / or available standards.

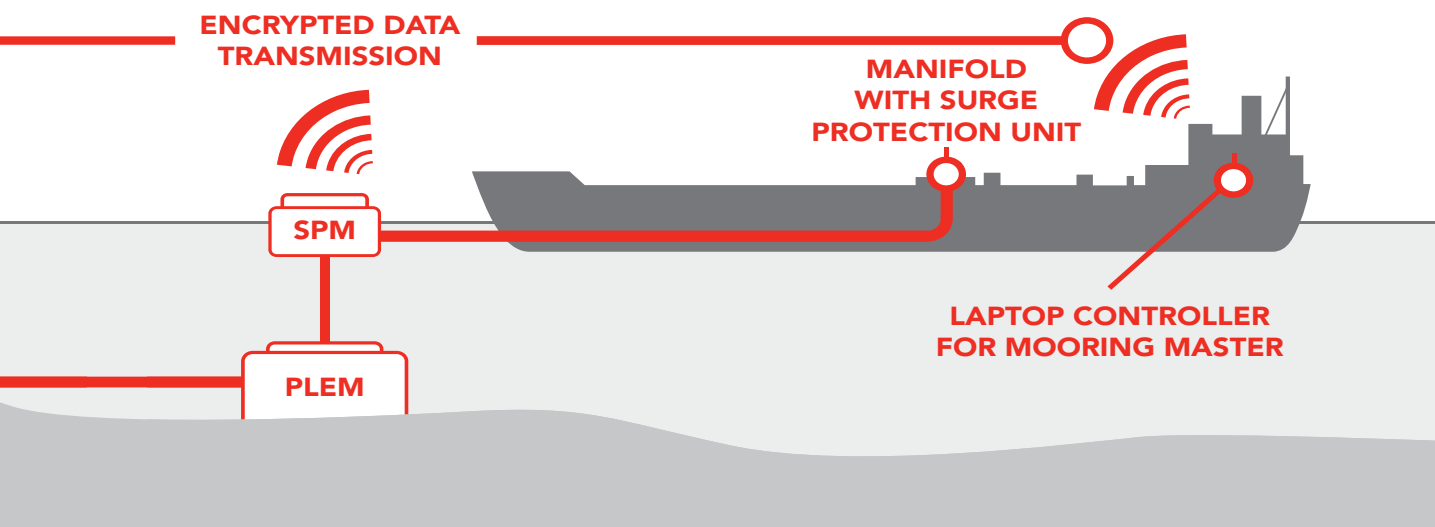
Asset Register

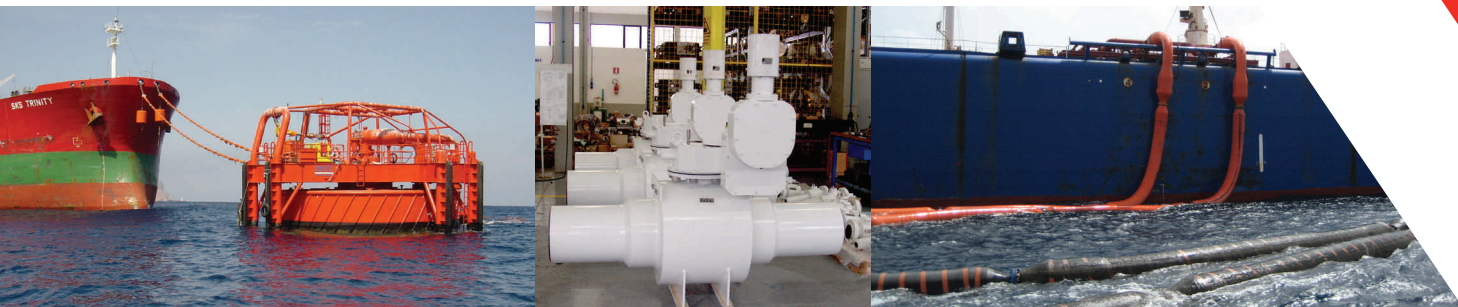
Maintain a stock list of all spares held in store, min / max stock levels, replacement lead times and so on. Record date that the asset is put into service, dates inspected, date retired, amount of work performed by the asset to assist in determining when defined retirement criteria are reached and to future consider whether longer / shorter service life is appropriate.

Policy and Procedural Adherence

All company policies can be stored and updated on the system with pre-set authorisation levels. New revisions are flagged automatically to specified users when they log onto the system. It records when users have read and accepted the revised procedures or require further guidance.

The same system can be used for training, for issuing permits to work, and for creating work procedures.





Offspring International Limited is a leading supplier of high quality equipment for Single Point and Conventional Buoy Mooring and offloading systems, Quay Reel® loading and unloading system, hoses, breakaway couplings, valves and actuators, pressure surge protection, navigational buoy moorings and renewables moorings.



For more information on Offspring International Mooring and Offloading Systems

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